

42. Name the atomic number:

a. iron: 26b. barium 56c. krypton 36

43. What are the atomic masses (in units of amu) of the two subatomic particles found in the nucleus?

protons and neutrons are both about 1 amu (atomic mass unit)

44. Use the periodic table to estimate the atomic masses of germanium, cobalt, and fluorine.

Ge: 73 amu ; Co: 59 amu ; F: 19 amu

45. a. What is the average atomic mass listed on the periodic table for sodium? (Include all decimals)

22.98977 amu

b. What is the most common isotope of sodium: sodium-22 or sodium-23. Why?

Sodium-23 because the weighted average is closer to 23

LESSON 13: Isotopes

46. Chlorine exists as two isotopes. Chlorine is 76% chlorine-35 and 24% chlorine-37. Determine the average atomic mass of chlorine. (You are calculating a weighted average here).

$$\text{Method \# 1: } \frac{(76 \times 35) + (24 \times 37)}{100} = 35.48 \text{ amu}$$

METHOD 2

$$(.76 \times 35) + (.24 \times 37)$$

35.48 amu

47. How many protons and neutrons are in an atom of bromine-80?

35 protons and 45 neutrons

48. What is the atomic number of an atom with 15 protons? What is the mass number of an atom with 15 protons and 16 neutrons?

$$\text{Atomic \#} = \# \text{ protons} = 15$$

$$\text{Mass \#} = \text{protons} + \text{neutrons} = 15 + 16 = 31$$

LESSON 14: Stable and Radioactive Isotopes

49. Are radioactive isotopes stable or unstable? Why?

Unstable: Nucleus has unstable ratio of protons to neutrons

50. The ratio of protons to neutrons in an atom determines its stability.

51. Complete the following table: (Use the periodic table for atomic numbers and element names/symbols only. Remember the mass on the periodic table is a weighted average atomic mass for all isotopes of an element.... whereas this table is referring to a single atom of an element.)

| Isotope Name | Isotope symbol | Atomic # | # of Protons | # of Neutrons | Mass # | # of Electrons |
|--------------|------------------------|----------|--------------|---------------|--------|----------------|
| lead-207 | $^{207}_{82}\text{Pb}$ | 82 | 82 | 125 | 207 | 82 |
| Zirconium-91 | $^{91}_{40}\text{Zr}$ | 40 | 40 | 51 | 91 | 40 |
| Cadmium-113 | $^{113}_{48}\text{Cd}$ | 48 | 48 | 65 | 113 | 48 |